

**SECTION I - EXECUTIVE SUMMARY
OF FACILITIES PLAN
FOR
WASTEWATER MANAGEMENT
TOWN OF NARRAGANSETT, RHODE ISLAND**



MARCH 2006

DRAFT



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1.0 EXECUTIVE SUMMARY

1.1 PLAN OVERVIEW

This Facilities Plan, prepared by James J. Geremia & Associates, Inc. for the Town of Narragansett, is a comprehensive study of both present and future needs for upgrading and expanding of the North End Sewer System (which contributes to the South Kingstown Regional Wastewater Treatment Facility), the South End Sewer System and Scarborough Wastewater Treatment Facility. The study demonstrates the most cost-effective and environmentally sound solution for achieving the Rhode Island Department of Environmental Management's (RIDEM) water quality objectives.

This study has been conducted and formatted to meet the requirements of the State Revolving Loan Program to ensure funding support for the various projects noted herein.

1.2 SERVICE AREA

1.2.1 NORTH END SEWER SYSTEM

Wastewater generated by the northern end of Town is serviced by the South Kingstown Regional Wastewater Treatment Facility. In January 1969, the Rhode Island General Assembly passed an enabling act which established a wastewater district, permitting South Kingstown to operate and maintain a publicly owned sewage treatment works. The agreement indicates that the cost disbursement for capital expenses were to be proportioned based on percentages of total design flow. Operating costs for the Town of Narragansett, including maintenance, repairs, supplies and administration would be based upon the actual metered flow from the Ouida Street Pumping Station.

Subsequent to the initial agreement with the Town of South Kingstown, a letter of agreement (dated 22 August 1974) agreed to guarantee at least 19% (0.785 MGD) of the treatment plant capacity, and stipulates that South Kingstown would not deny additional capacity if that capacity exists in the facility. This 1974 agreement did not have any provision for the purchase of unused capacity and the reassessment of the other partners.

During the 1984 fiscal year, the Town of Narragansett discharged an average of 905,000 gallons per day to the treatment facility, that represented 21.9% of the total plant capacity. It was acknowledged by South Kingstown that sufficient excess space existed to accommodate Narragansett's excess flow over the short term. However, South Kingstown indicated that plans had to be formulated and adopted in order to address the future plant expansion agreement and to protect the existing plant capacity ownership rights of South Kingstown and the University. To that end, the Towns (in January 1985) entered into an agreement that laid out when and how the plant expansion would occur.

In 1989, Narragansett voters approved a bond referendum for \$9.8 Million implemented an aggressive plan to sewer the north end. This referendum was brought about as a result of the chronic problems the residents were experiencing with failed ISDS systems, high groundwater, and the impact these failed systems had on the Narrow River.

This increase in sewer connections resulted in the Town exceeding its reserve capacity of 784,700 gpd. To alleviate the need to upgrade South Kingstown RWWTF, the Town entered into an agreement (in April 1995) with the University of Rhode Island to lease their unused capacity in the treatment facility. This lease agreement allowed Narragansett to increase its capacity at the RWWTF by 400,000 gallons per day. The agreement allowed this use for a five year period at a cost of \$425,000 (paid over that period).

In 1997, as a result of process improvements at the Regional Facility, the Rhode Island Department of Environmental Management (RIDEM) granted an increase in the capacity to South Kingstown's permit from 4.13 MGD to 5.0 MGD. This provided an additional flow of 0.87 MGD which could be distributed to each of the participants. Since the University of Rhode Island did not need any additional capacity, South Kingstown and Narragansett were able to increase their capacity equally.

The increase in wastewater allocated to Narragansett (increased by 435,000 gallons per day) was still not sufficient to meet the needs of the community. Therefore, in July 2001, when the lease between the University of Rhode Island and Narragansett came up for renewal, Narragansett signed a new agreement that again leased 400,000 gpd through June 30, 2006 for a total cost of \$560,000. The following Table 1-1 shows the current flow distribution, including the 1995 and 2001 leased amounts from the University.

TABLE 1-1 CURRENT FLOW DISTRIBUTION						
Partner	Original Capacity 1974 (MGD)	Original Percentage (%)	1992 Expansion (MGD)	1995/2001 URI-Narragansett Leases (MGD)	Current Available Capacity (MGD)	Current Available Percentage (%)
South Kingstown	1.6933	41.00	0.4350	0.000	2.1283	42.57
Narragansett	0.7847	19.00	0.4350	0.400	1.6197	32.39
URI	1.6520	40.00	0.0000	(0.400)	1.2520	25.04
Totals	4.13	100.00	0.8700	0.00	5.0000	100.00

Leasing 400,000 gallons from the University is a stop gap measure to avoid having Narragansett responsible for funding a physical plant expansion or purchasing unused capacity. Narragansett is the only regional partner at this time that has to expand sewer services to meet the needs of the community.

Narragansett's flow totals have fluctuated below and above the allotted capacity of 1.6197 over the past ten (10) years. This was a direct factor in the Town's lease of flow space from URI, as well as the adoption of a restrictive Sewer Policy governing extensions and connections in the area tributary to the Regional WWTF. While both the Town of South Kingstown and URI are projecting future flow increases, it is not expected that either of those regional partners will need additional flow space within the study period used to develop this plan. As such, the following general strategies and options exist for Narragansett with respect to future flow capacity at the Regional WWTF:

1. No Action – Under this scenario, the following is presented:
 - a) Narragansett will need to continue the strict enforcement/application of its Sewer Policy, which restricts new connections in the tributary area to properties with existing sewer frontage.
 - b) Narragansett will continue to grow (market-driven), especially given the proliferation of Innovative/Alternative (I/A) Individual Sewage Disposal Systems (ISDS) designs being approved by the State.

- c) The Congdon Street and Ouida Street Pump Stations will still need upgrades (see Section 1.4 of this Executive Summary).
- d) Narragansett will need to continue its lease of flow space from URI.
- e) A physical expansion of the Regional WWTF will not be needed for the foreseeable (10-15 years) future.
- f) Narragansett will not have a great deal of flexibility when dealing with affordable housing or other development initiatives.

2. Physical WWTF Expansion – Under this scenario, the following is presented:

- a) Based on the information presented herein (Table 4-11; with the WWTF at 59.9% of capacity), Narragansett would be building overall physical capacity that will not be needed for the foreseeable future.
- b) Narragansett is the only regional partner that will need additional capacity; hence, Narragansett will pay for all of it.
- c) The Congdon Street and Ouida Street Pump Stations will still need upgrades.
- d) The additional capacity will not be available for 4-5 years, based on design, permitting, and construction projections.
- e) It should be noted that there will be certain Regional WWTF capital upgrades that may or may not be directly related to capacity that will be needed in the upcoming years. These are addressed in greater detail within this *Facilities Plan* (Tables 1-3 and 1-4).

3. Flow Allocation Agreement – Under this scenario, the flow allocation agreement with the regional partners would be re-negotiated, with the objective being for Narragansett to lease and/or purchase a share of the other partners' unused capacity. The following would apply:
 - a) The capacity would be available immediately, allowing Narragansett flexibility in dealing with affordable housing and other developmental initiatives.
 - b) Narragansett would need to restructure its Sewer Policy to prioritize how this additional capacity would be allocated.
 - c) The Congdon Street and Ouida Street Pump Stations will still need upgrades.
4. I/I Removal – This is actually a component of all of the above scenarios, subject to an on-going review of the cost-effectiveness of each solution (i.e. performing I/I work that has a reasonable cost-per-gallon ratio). There is the potential here for outside participation, to wit:
 - a) The Town of Narragansett could develop a “capacity-credit” program, wherein an applicant that meets certain defined criteria (i.e. affordable housing, creative commercial initiatives, etc.) could pay to remove I/I in exchange for sewage capacity being made available. This could be tied to the empirical peak flow factor that has been developed for the Pier area within this *Facilities Plan* report, namely 2.5 times the Average Daily Flow. In other words, if an applicant that meets whatever criteria is established needs relief from the Town's Sewer Policy, he/she would have to provide for 2.5 times their projected flow in I/I removal. The independent I/I studies that have been conducted by the Town provides the ability to calculate defensible numerical I/I removal cost-per-gallon figures. Additional information on this would be presented to the Town Council in a separate report.” Based upon a build-out for the North End and the projected needs of the Regional Partners through the year 2025, the South Kingstown Regional Wastewater Treatment Facility will need to be upgraded to meet an average daily flow of 6.199 MGD. Table 1-2 presents Narragansett's projected needs, not including the 400,000 leased from URI.

TABLE 1-2 PROJECTED NEEDS						
Partner	Original Capacity 1974 (MGD)	Original Percentage (%)	1992 Expansion (MGD)	Current Available Capacity (MGD)	2025 Capacity (MGD)	2025 Percentage (%)
South Kingstown	1.6933	41.00	0.4350	2.1283	2.747	44.3
Narragansett	0.7847	19.00	0.4350	1.2197	1.800	29.1
URI	1.6520	40.00	0.0000	1.6520	1.652	26.6
Totals	4.13	100.00	0.8700	5.0000	6.199	100.00

The preliminary design of the South Kingstown Regional Wastewater Treatment Facility, as presented in the South Kingstown Regional Wastewater Facilities Plan dated 2006, divides the improvements into two categories. The first component corresponds to the hydraulic upgrades necessary to meet the population demands for 2025; the second component corresponds to the necessary upgrades associated with process improvements.

The unit processes that relate to hydraulic expansion are:

Two (2) Primary Settling Tanks
Two (2) Primary Sludge Pumps
One (1) Waste Activated Sludge Pump
One (1) Return Activated Sludge Pump
Sludge Thickener
Aeration System

The unit processes that relate to system upgrades are:

Odor Control - Headworks
Odor Control - Primary Settling Tank
Odor Control - Septage Receiving
Odor Control - Sludge Holding Tanks
Septage Receiving Station
Sludge Building Enclosure

Table 1-3 presents the regional cost breakdown relating to the hydraulic expansion. Those components that are directly related to a hydraulic upgrade are distributed to South Kingstown and Narragansett based on their projected need. For example, the increase over the current capacity is 1.199 MGD, of which 0.619 MGD (or 51.6%) relates to South Kingstown's needs, while 0.58 MGD (or 48.4%) relates to Narragansett's future needs.

TABLE 1-3 PROJECT COST SUMMARY FOR HYDRAULIC EXPANSION REGIONAL WASTEWATER TREATMENT FACILITY				
UNIT PROCESS	TOTAL CAPITAL COST	SOUTH KINGSTOWN	NARRAGANSETT	U.R.I.
Primary Settling				
• (2) Settling Tanks	\$ 1,600,000	\$ 832,000	\$ 768,000	\$
• Sludge Pumps	95,000	49,400	45,600	
Aeration System - Basin	1,200,000	619,200	580,800	
Diffusers	450,000	234,000	216,000	
Secondary Settling Tank				
• WAS Pumps	60,000	31,200	28,800	
• RAS Pumps	65,000	33,800	31,200	
Sludge Thickener	150,000	77,400	72,600	
Sub-Total	\$ 3,620,000	\$ 1,877,000	\$ 1,743,000	\$ 0
Auxiliaries ¹ (12%)	434,400	225,240	209,160	0
Sub-Total	\$ 4,054,400	\$ 2,102,240	\$ 1,952,160	\$ 0
Engineering Allowance (15%) (Design, Construction Admin., Resident Eng.)	608,160	315,336	292,824	0
TOTAL	\$ 4,662,560	\$ 2,417,576	\$ 2,244,984	\$ 0

¹ Includes 12% allowance for overall modifications to mechanical and electrical systems and other auxiliary equipment such as plant water system, spray water system, sump pumps, buildings and yard improvements.

Table 1-4 presents the regional cost breakdown for the process components that are considered upgrades to the original facility, the capital cost distribution is based on the 2025 percentage presented in Table 1-2 and shared by all Regional Partners.

TABLE 1-4 PROJECT COST SUMMARY FOR PROCESS UPGRADES REGIONAL WASTEWATER TREATMENT FACILITY				
UNIT PROCESS	TOTAL CAPITAL COST	SOUTH KINGSTOWN	NARRAGANSETT	U.R.I.
Headworks Odor Control	\$ 200,000	\$ 88,600	\$ 58,200	\$ 53,200
Solids Handling Facilities (including Odor Control)	3,500,000	1,550,500	1,018,500	931,000
Primary Odor Control	750,000	332,250	218,250	199,500
Septage	500,000	221,500	145,500	133,000
Sub-Total	\$ 4,950,000	\$ 2,192,850	\$ 1,440,450	\$ 1,316,700
Auxiliaries ¹ (12%)	594,000	263,142	172,854	158,004
Sub-Total	\$ 5,544,000	\$ 2,455,992	\$ 1,613,304	\$ 1,474,704
Engineering Allowance (15%) (Design, Construction Admin., Resident Eng.)	831,600	368,398	241,996	221,206
TOTAL	\$ 6,375,600	\$ 2,824,390	\$ 1,855,300	\$ 1,695,910

¹ Includes 12% allowance for overall modifications to mechanical and electrical systems and other auxiliary equipment such as plant water system, spray water system, sump pumps, buildings and yard improvements.

1.3 SOUTH END SEWER SYSTEM

The Scarborough treatment system for the southern section of Town was evaluated with respect to its ability to meet established effluent limitations and water quality objectives at both present and future flow rates and waste load. As in the north end, the Facilities Plan has projected the need through 2025. For the purposes of this report, 2025 is considered to be the build-out year for the South End. The corresponding sewer population in the South End is projected to be 9,416 individuals, and the corresponding number of housing units sewer is 3,891.

An analysis of the treatment facility indicates that under presently observed influent loads, the existing Scarborough Wastewater Treatment Facility is operated with a maximum achievable efficiency. In fact, with the

implementation of the Industrial Pretreatment Program and the compliance from the industries, the peak daily BOD₅ and Total Suspended Solids loadings no longer exceed the plant's design parameters. The treatment system is performing well under the design parameters. Based on that determination, it has been concluded that only minor upgrades would be required to further optimize plant performance through process control and will permit the facility to meet its projected loadings through 2025.

The planning period for the evaluation is based on a 20-year period of projected growth and effluent quality. Based upon the current usage projection over the 20-year planning period, the wastewater projections finds that the plant will not exceed its designed hydraulic or organic capacity. The recent re-issuance of the facility's new permit (August 2005) has confirmed that nutrient removal will not be required during the five-year permit. Therefore, for the future planning period, the Town will focus on the replacement of existing equipment within their annual capital budget.

Integrated in this planning period is RIDEM's requirement to begin the planning process for upgrading a treatment facility when the facility reaches 80% of its design capacity. In the case of the Scarborough facility, this will occur when the flows reach 1.12 MGD. Since there is no immediate need to upgrade and expand the facility, the capital plan will focus on replacing the equipment as it reaches its useful life and upgrade other areas within the process. As part of the replacement process, each new component will be increased in its hydraulic capacity from the original design flows (1.4 MGD) by 25% (or 1.75 mgd) to ensure that those components are upgraded and will not be controlled by the 80% factor through the planning year 2025.

1.3.1 SCARBOROUGH TREATMENT PLANT UPGRADES

Based on the detailed review of the existing facilities, performance records, maintenance records, previous engineering studies, and pertinent regulatory requirements, process modifications will be required. The current system is adequate to meet the current and projected flows with a hydraulic capacity of 4.0 mgd. Due to the age of the system, the equipment should be replaced as part of the next ten year capital improvement project. The design should be based on a peak hydraulic capacity to 5.25 mgd (based upon 125% of the current maximum capacity of 4.2 MGD).

Influent Pumping Station: The influent pump station is of a dry pit design and contains two (2) variable and one (1) constant speed, 25 horsepower pumps which lift the wastewater into the oxidation ditches. At the present, the facility performs satisfactorily, however, it has reached its useful life and needs to undergo a major overhaul. The upgrade will be designed to handle a range from 0.3 MGD (minimum) to 5.25 MGD (maximum) with two pumps, while the third pump will serve as a standby.

Headworks - Odor Control: In an effort to reduce the odor associated with the raw influent, it is recommended that the headworks be enclosed and the off-gases from the enclosed headworks and influent pump station be processed through a two-stage odor control system dedicated to the headworks.

Primary Clarifier: The addition of two (2) primary clarifiers and related primary sludge pumps is to be included within the long range Capital Improvement Plan. The idea behind this concept is that depending on the ratio of a soluble to suspended BOD₅ concentrations of the raw sewage, the sufficiently sized primary clarifiers can reduce up to 75% of solids and up to 35% of organic loads delivered for treatment to the activated sludge system, thereby eliminating the necessity of expanding the aeration capacity to meet the future treatment requirements. The primary clarifiers will be designed for an average daily flow of 1.75 mgd and a peak loading of 5.25 mgd. The avoidance of odors is critical in the consideration of any process upgrades. Therefore, the primary clarifier weir will be sealed with a launder cover designed from fiberglass reinforced plastic. The cover will be gastight designed to entrap 94 to 98% of the odor generated at the weirs. The entrapped gas under the weir covers will be withdrawn off through a two stage odor abatement system.

Secondary Clarification: The upgrade and expansion of the secondary clarification facilities will be required as part of the Capital Improvement Plan. One additional 40-foot diameter, 11-foot side water depth clarifier will work in conjunction with the two existing clarifiers. The third clarifier will allow the plant to maintain its effluent quality at peak hydraulic loadings and still take one unit out of service for maintenance.

Disinfection: Based upon the 25% increase in capacity, the two chlorine tanks will achieve the 37 minute detention time at average daily flow, however, at peak flows provides for only 12 minutes of detention time. Based upon RIDEM criteria of 15 minutes peak flow, the existing chlorine tanks are to be expanded to meet the 25% criteria. The construction of the chlorine contact tank should occur before or in conjunction with the

addition of the secondary clarifier to allow for placement of the secondary clarifier in the location of the existing chlorine contact tank.

Table 1-5 presents a breakdown of the capital cost.

TABLE 1-5 TOTAL CAPITAL COST SUMMARY - SCARBOROUGH FACILITY	
UNIT PROCESS	TOTAL CAPITAL COST ²
Headworks Screening Grit Removal Odor Control	\$ 640,000
Influent Pump Station	780,000
Primary Settling (2) Settling Tanks Sludge Pumps Scum Pumping System Odor Control	3,420,000
(1) Final Settling Tank WAS Pumps RAS Pumps	1,302,000
Chlorination	1,020,000
Sub-Total Auxiliaries ¹	\$ 7,162,000 860,000
Sub-Total Engineering Allowance (Design, Construction Administration, Resident Eng.)	\$ 8,022,000 215,000
TOTAL	\$ 8,237,000

¹ Includes 12% allowance for overall modifications to mechanical and electrical systems and other auxiliary equipment such as plant water system, spray water system, sump pumps, buildings and yard improvements.

² Includes 20% contingencies.

1.3.2 WASTEWATER COLLECTION SYSTEM

In the future adequacy determination of the interceptor systems and pumping stations, it was determined that the Congdon Street Pumping Station (south end), Stanton Avenue Pumping Station and Ouida Street Pumping Station (north end) were inadequate to convey wastewater flows under future conditions. The future sewered area in the South End (such as Harbour Island, Great Island and Baltimore Avenue area) will require pumping stations to convey the sewage flows generated by Harbour Island and Great Island to connect to the South End Sewer System.

Congdon Street Pumping Station: The existing inadequate Congdon Street pumps will be replaced with new pumps and the force main will be replaced. The new 6-inch ductile iron force main will replace the existing 4-inch ductile iron force main in the same trench. The renovated pumping station will have a capacity of 436,000 GPD (305 GPM). The two pumps will be the vertical centrifugal type rated at 375 GPM each with 5 horsepower motors. The estimated cost of the project is \$650,000.

Stanton Avenue Pumping Station: The proposed Stanton Avenue Pumping Station sewage pumps will be replaced.. The capacity of the station will be 624,000 GPD (440 GPM). The station will consist of two sewage pumps, each rated at 440 GPM with constant speed motors. During the installation of the new pumps, the contractor will be required to by-pass pump. The total estimated cost of the pump station is \$625,000 (including engineering fees).

Ouida Street Pumping Station: The Ouida Street Pumping Station will be renovated to accommodate the future flows. The pumping station service area is in the North End Sewer System, including the Middlebridge area of South Kingstown. The existing pumps, motors, flow, meter, and variable speed drives will be replaced with new units having the capacity to convey the future flows. The station will consist of three variable speed pumps, each having a capacity of 2,279,000 GPD (1,585 GPM), with 150 horsepower motors. Currently, the station is being equipped with a Data Acquisition System which will transmit flows and alarms via radio system to the Scarborough Wastewater Treatment Facility and to the police station. Also, the inoperable mechanical bar screen will be replaced. The total cost of the improvements is \$975,000.

Harbour Island Wastewater Collection System: The Harbour Island Wastewater Collection System will consist of conventional gravity sewers and grinder pumps and pressure sewers serving 320 residential dwelling units. Approximately 50 grinder pumps will be required for dwellings located within low lying areas. The average flow generated by Harbour Island is 102,400 GPD, with an associated peak flow of 268,800 GPD. The Harbour Island Pumping Station will transport the sewage flows via a force main to the Briggs Farm sewer system. The pumping station will consist of two self-priming centrifugal sewage pumps, each rated at 268,800 GPD (190 GPM). The total estimated cost for the Harbour Island Wastewater Collection System is \$7,585,600 (\$30,512 per home) as summarized in Table 1-6.

TABLE 1-6 ESTIMATE OF PROJECT COST FOR THE HARBOUR ISLAND WASTEWATER COLLECTION SYSTEM	
8" PVC Pipe	\$ 1,428,000
Sewer Wyes	32,000
6" PVC Pipe	400,000
6" Force Main, including directional drilling	590,000
Precast Concrete Manholes	225,000
Force Main Cleanout	5,000
Rock Excavation	87,500
Gravel Refill	180,000
Test Pits	20,000
Dewatering	200,000
Erosion Control	100,000
Traffic Control	150,000
Temporary Pavement	280,000
Pavement Restoration	976,000
Grinder Pumps	375,000
Pumping Station	500,000
Sub-Total	\$ 5,548,500
Construction Contingencies (25%)	1,387,100
Sub-Total	\$ 6,935,600
Engineering Design Services	100,000
Construction Administration and Resident Inspection	550,000
TOTAL	\$ 7,585,600

Great Island Wastewater Collection System: The Great Island Wastewater Collection System will consist of conventional gravity sewers in combination with grinder pumps and pressure sewers to provide a cost effective system for 375 residential dwellings. This sewer system will convey flows to the proposed Great Island Pumping Station to be located prior to the Point Judith Pond Bridge crossing. The capacity of the pumping station will be 313,000 GPD (220 GPM). Table 1-7 summarizes the estimated costs for the components necessary for the construction of the sewer system. The total estimated cost of the Great Island Wastewater Collection System is \$8,750,000 (\$29,909 per home).

TABLE 1-7 ESTIMATE OF PROJECT COST FOR THE GREAT ISLAND WASTEWATER COLLECTION SYSTEM	
Force Main	\$ 225,000
8" PVC Pipe	1,708,000
Sewer Wyes	37,500
6" PVC Pipe	470,000
Precast Concrete Manholes	250,000
Force Main Cleanout	10,000
Rock Excavation	95,000
Test Pits	40,000
Gravel Refill	220,000
Erosion Control	150,000
Dewatering	300,000
Traffic Control	150,000
1½" Temporary Pavement	323,500
Pavement Restoration	1,164,000
Pumping Station	500,000
Grinder Pumps	750,000
Sub-Total	\$ 6,393,000
Construction Contingencies (25%)	1,598,300
Sub-Total	\$ 7,991,300
Engineering Design Services	120,000
Construction Administration and Resident Inspection	639,000
TOTAL	\$ 8,750,300

Baltimore Avenue Area Wastewater Collection System: The Baltimore Avenue Area Wastewater Collection System will consist of conventional gravity sewers serving 49 residential dwellings. The sewer system will consist of approximately 5,000 linear feet of gravity sewers. Table 1-8 summarizes the estimated costs for the components necessary for the construction of the sewer system. The total estimated cost of the Baltimore Avenue Area Wastewater Collection System is \$1,409,300 (\$35,000 per home).

TABLE 1-8 ESTIMATE OF PROJECT COST FOR THE BALTIMORE AVENUE AREA WASTEWATER COLLECTION SYSTEM	
8" PVC Pipe	\$ 350,000
Sewer Syes	4,900
6" PVC Pipe	65,000
Precast Concrete Manholes	50,000
Rock Excavation	35,000
Gravel Refill	30,000
Test Pits	10,000
Dewatering	50,000
Erosion Control	20,000
Traffic Control	25,000
Temporary Pavement	60,000
Permanent Pavement Restoration	253,200
State Roadway Restoration	54,300
Sub-Total	\$ 1,007,400
Construction Contingencies (25%)	251,900
Sub-Total	\$ 1,259,300
Engineering Design Services	50,000
Construction Administration and Resident Inspection	100,000
TOTAL	\$ 1,409,300

Knowles Campground Wastewater Collection System: The Knowles Campground Wastewater Collection System will consist of gravity sewers serving 110 residential units. The sewer system will consist of approximately 3,400 linear feet of gravity sewers. Knowles Campground began installing the sewer system in February 2006 and will be responsible for the construction as well as the long term maintenance of the system.